Space Weather Forecast

Issued on Wednesday 18 December 2024 at 01:12 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further Minor Storms on Day 1, then easing.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low, with only minor Common class flares. There are six sunspot regions on the Earth-facing disc. The region in the southwest remains the most complex sunspot group on the disc, but the region has shown stability. The next region of interest, in the central southern hemisphere has shown the most recent development but again, remains stable at present. The Earth experienced a Coronal Mass Ejection (CME) thought to be from a filament eruption early on the 15 Dec. Further eruptions were observed off the East limb early on the 17 Dec, unlikely to be Earth-directed, followed by a notable halo CME at 17/1600 UTC. From analysis this looks most likely to be far-sided with limited impact to Earth.

Solar Wind / Geomagnetic Activity: Solar winds showed a significant increase during the early hours of the 17 Dec with the arrival of a CME at 17/0437UTC. Solar winds peaked at 700km/s around 17/0900 UTC but have since slowed to Slightly Elevated levels at 500km/s. The Interplanetary Magnetic Field (IMF), was initially weak but rose to Strong northward levels during the CME influence becoming Moderately southwards from 17/1800 UTC. This activity resulted in a G2 Moderate storm between 0300-0900 UTC, followed by a G1 Minor 0900-1200 UTC, and is currently at Unsettled activity (Kp3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate Solar activity is forecast with a chance of Moderate class flares, increasing gradually through the forecast period.

Solar Wind / Geomagnetic Activity: The CME experienced at Earth during the morning of 17 Dec is likely to continue to wane through the early part of Day 1 (18 Dec), with a chance of isolated G1 Minor storms possible until it does. Then a reduction back to Quiet to Unsettled (Kp1-3) conditions. Several other CMEs that left the Sun in the past few days are forecast as near misses, but cannot be completely ruled out as flanking arrivals at Earth, so there is some uncertainty in the forecast currently.

Energetic Particles / Solar Radiation: There is a slight chance of S1/Minor solar radiation storms or greater, in response to any notable solar flares.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

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Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	40	10	5	5
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	No	40	50	60	60
Very Active	R3-R5 (X Class)	No	5	5	5	5

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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